

Beam Charge Support

Changes to BLMS

Fri, Apr 6, 2001

It is necessary to add support for accumulation of Booster beam charge to that for the beam loss monitors. The support for the beam charge must be slightly different than that for the beam loss. The analogous logic to the total loss summations of the BLMS would be to accumulate the injected charge signal, perhaps. But to discover the injected charge signal from the waveform, we may want to scan the waveform near injection time and grab the peak value, since the beam charge is expected to decrease during the Booster acceleration cycle. It might be wise to keep the scan fairly short. Should it begin with the start of the beam loss waveform as used for the base of the beam loss total summation logic?

As for the millisecond accumulations, the beam charge is not the output of an integrator, so differences should not be computed. What's more, the beam charge signal is not the output of a logarithmic amplifier, so it should not be given antilog treatment. The charge should simply be sampled for each millisecond and accumulated. Should it be sampled with the same indexing used for sampling the BLM signals?

The units that should be used for the beam charge signal are of course engineering units, which should be E12. This means that the scaling constants will have to be used from the analog descriptor.

Finally, how can BLMS know that it should use such modified logic for a given signal? How does it know what channel has a beam charge signal? There is one spare parameter available for BLMS, assuming that we can always take the base address of the differential sum structure as an even multiple of 2^{16} so that the low word of the address is 0x0000. (it is currently located at 0x00430000 in all BLM IRM nodes.) If this spare parameter were used as the channel number of the beam charge signal, the program logic could watch for that in its loops.